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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/824,332	04/02/2001	Jackson I. Ito	MAC-0113-US	9413
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EXXONMOBIL RESEARCH AND ENGINEERING COMPANY P.O. BOX 900 1545 ROUTE 22 EAST ANNANDALE, NJ 08801-0900				
			EXAMINER LEUNG, JENNIFER A	
			ART UNIT 1764	PAPER NUMBER

DATE MAILED: 02/02/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

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Office Action Summary

Application No.

09/824,332

Applicant(s)

ITO ET AL.

Examiner

Jennifer A. Leung

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 22 October 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 15, 18-20, 25-38, 40, 41, 44, 46, 47, 50, 52 and 54-57 is/are pending in the application.
- 4a) Of the above claim(s) 26-36 and 54 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 15, 18-20, 25, 37, 38, 40, 41, 44, 46, 47, 50, 52 and 55-57 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☒ Claim(s) 15, 18-20, 25-38, 40, 41, 44, 46, 47, 50, 52 and 54-57 are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

DETAILED ACTION

Response to Amendment

1. Applicant's amendment submitted on October 22, 2003 has been received and carefully considered. The changes made to the Specification are acceptable. Claims 1-14, 16, 17, 21-24, 39, 42, 43, 45, 48, 49, 51 and 53 are cancelled. Claims 26-36 and 54 are withdrawn from consideration, being drawn to a non-elected invention. Claims 15, 18-20, 25, 37, 38, 40, 41, 44, 46, 47, 50, 52 and 55-57 are currently under prosecution in the application.

Response to Arguments

2. Applicant's arguments regarding the rejection of claims 41, 42 and 44-47 under 35 U.S.C. 102(b) as being anticipated by Metrailler et al. (US 2,952,619) have been fully considered and are persuasive. Therefore, said rejection has been withdrawn.

3. Applicant's arguments regarding the rejection of claims 15, 18-20, 25, 37, 38, 40, 41, 44, 46, 47, 50, 52 and 55-57 under 35 U.S.C. 103(a) as being unpatentable over Piotter et al. (US 4,931,171) have been fully considered but they are not persuasive. On page 15, applicants argue (with emphasis added),

"The apparatus of the present invention is designed to produce small liquid drops from a gas-liquid mixture without a change in chemical composition... This is the complete opposite from Piotter et al."

"Piotter et al. specifically disclose a mixing device for a combustion between two gaseous species: fuel and air or steam. It is important for the Piotter mixing device to achieve intimate mixing at the molecular level for a prescribed air-to-fuel ratio. Ignition of the fuel-air mixture in Piotter et al. is affected by spark plug 214... The purpose of Piotter et al. is about combustion, which is a chemical reaction."

The examiner respectfully disagrees and maintains her position. In response to applicant's

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argument that the apparatus of Piotter et al. (i.e., intended for use in producing small liquid drops with a change in chemical composition) is nonanalogous to applicant's apparatus (i.e., intended for use in producing small liquid drops without a change in chemical composition), it has been held that a prior art reference must either be in the field of applicant's endeavor or, if not, then be reasonably pertinent to the particular problem with which the applicant was concerned, in order to be relied upon as a basis for rejection of the claimed invention. See *In re Oetiker*, 977 F.2d 1443, 24 USPQ2d 1443 (Fed. Cir. 1992). In this case, the prior art reference is reasonably pertinent to the particular problem of uniform fluid dispersion or atomization, with which applicant is likewise concerned.

In addition, although the intended use for the apparatus of Piotter et al. is to combust the uniform fluid dispersion, a recitation of the intended use of the claimed invention must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim. See *In re Casey*, 152 USPQ 235 (CCPA 1967) and *In re Otto*, 136 USPQ 458, 459 (CCPA 1963). As commented below, the language of the claimed invention structurally meets the disclosed structure of the apparatus of Piotter et al., and would therefore, inherently, be capable of performing the intended use of uniform fluid dispersion without a change in chemical composition (i.e., by simply not igniting spark plug 214). The omission of an element with a corresponding omission of function is within the level of ordinary skill. *In re Wilson* 153 USPQ 740 (CCPA 1967); *In re Portz* 145 USPQ 397 (CCPA 1965); *In re Larson* 144 USPQ 347 (CCPQ 1965); *In re Karlson* 136 USPQ 184 (CCPA 1963); *In re Listen* 58 USPQ 481 (CCPA 1943); *In re Porter* 20 USPQ 298 (CCPA 1934).

Claim Rejections - 35 USC § 103

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

4. Claim 15, 18-20, 25, 37, 38, 40, 41, 44, 46, 47, 50, 52 and 55-57 are rejected under 35 U.S.C. 103(a) as being unpatentable over Piotter et al. (US 4,931,171).

Regarding claims 15, 18-20, 52, 56 and 57 Piotter (FIG. 6; column 18, line 31 to column 19, line 31) discloses an apparatus comprising:

- a. a central passageway (i.e., defined by walls of mixing zone **200** and upper surface of nozzle **224**), allowing a fluid to pass there through (i.e., fuel; column 4, lines 36-45);
- b. an atomization zone (i.e. defined by lower surface of nozzle **224**) positioned downstream from and in fluid communication with said central passageway;
- c. a plurality of atomization fluid passageways **216**, **218**, **220** fluidly communicating with the central passageway via atomization fluid passageway outlets (i.e., apertures **222**), positioned concentrically about a perimeter of the central passageway;
- d. a heating zone configured to promote heat exchange between the central passageway and the plurality of atomization fluid passageways **216**, **218**, **220**, wherein the heating zone is positioned upstream from the atomization zone (i.e., "air or air and off gas is introduced through line **216**, passes through annular chamber **218** in *indirect heat exchange* with the combustion zone," column 18, lines 58-63);
- e. a mixing zone **200** comprising a first inlet (i.e., fuel introduction conduit **208**) for a fluid to be atomized and a second inlet (i.e., air introduction means **210**) positioned upstream of said central passageway from said atomizing fluid passageway outlets **222**, which

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mixing zone **200** is in fluid communication with said central passageway; and

- f. a stream splitter (i.e., barrier means **212**) positioned within the central passageway upstream from the atomization fluid passageway outlets **222**;

wherein at least one of the two dimensions of the central passageway cross-section converges in a downstream direction along at least a portion of its length (i.e., converging section as defined by upper surface of nozzle **224**); and wherein at least one of the two dimensions of the atomization zone cross-section diverges in a downstream direction along at least a portion of its length (i.e., diverging section defined by lower surface of nozzle **224**).

Piotter further discloses the second inlet **210**, "can be any of the well known means for creating a *swirling annular stream of air*, such as *an annular ring* with fins at appropriate angles, *a plurality of peripheral, tangential introduction ports or the like*," thereby mixing the fluid streams via a combination of axial and radial flow, inherent of the swirling (emphasis added; column 18, lines 40-44). Although Piotter does not identify such means as a "sparger", the means as disclosed functions substantially as the recited "sparger... comprised of a cylindrical conduit containing a plurality of sparger fluid passageways", and thus meets the claim.

Although air is used as the atomization fluid in the embodiment of FIG. 6, Piotter suggests the use of steam as an equivalent to air in an alternate embodiment (column 13, lines 7-12). In any event, the apparatus meets the claims, since selection of either air or steam for the atomization fluid is merely a matter of intended use, as the apparatus is structurally capable of utilizing either gaseous fluid.

In terms of the claim recitation, "a heating zone... configured to superheat said steam," the specification (page 2, lines 16-18) states, "heat exchange takes place upstream of the

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atomizing means, in at least on heat exchange means which may comprise, for example, a heat conductive apparatus or body having a plurality of fluid passage means therein.” Therefore, the apparatus of Piotter, which must comprise “a heat conductive apparatus or body” to enable the disclosed indirect heat exchange, would be inherently capable of functioning as a “steam superheater” depending on the choice of atomizing fluid and the relative temperatures of the incoming atomizing fluid and feed streams, respectively.

Piotter is silent as to the specific angle of the atomizing fluid passageway outlets **222**. In any event, it would have been an obvious design choice for one of ordinary skill in the art at the time the invention was made to select an appropriate angle (i.e., a forward angle measurement greater than 60°) for the outlets in the apparatus of Piotter, on the basis of suitability for the intended use and absent showing any unexpected results thereof, since the specific angle degree is not considered to confer patentability to the claim since the precise angle would have been considered a result effective variable by one having ordinary skill in the art. Also, it is noted that the present specification sets forth on page 18, lines 18-20, that the claimed angle measurement, is at best, a preferred limitation. As such, without more, the claimed angle measurement cannot be considered “critical”. Accordingly, one having ordinary skill in the art would have routinely optimized the degree of the forward angle in the system to obtain the desired fluid flow characteristics, *In re Boesch*, 617 F.2d. 272, 205 USPQ 215 (CCPA 1980), and since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233.

Regarding claims 25, 37, 38 and 40, Piotter discloses both dimensions of the central passageway converge in the downstream direction (i.e., converging upper section of nozzle **224**;

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FIG. 6), wherein the converging dimension of the passageway and the diverging dimension of the atomization zone (i.e., diverging lower section of nozzle **224**) are co-planar.

Regarding claims 41, 45 and 55, Piotter (FIG. 6; column 18, line 31 to column 19, line 31) discloses an apparatus comprising:

- a. a central passageway (i.e., defined by walls of mixing zone **200** and upper surface of nozzle **224**), allowing a fluid to pass there through (i.e., fuel; column 4, lines 36-45);
- b. an outlet comprising an atomization zone (i.e., defined by lower surface of nozzle **224**) and a spray distributor (i.e., defined by nozzle **206**) positioned downstream from and in fluid communication with said central passageway, which spray distributor **206** is configured to promote a predetermined spray pattern;
- c. a plurality of atomization fluid passageways **216**, **218**, **220**, fluidly communicating with the central passageway via atomization fluid passageway outlets (i.e., apertures **222**), and
- d. a heating zone configured to promote heat exchange from a petroleum feed and the atomization fluid before the petroleum feed and the atomization fluid mix (i.e., "air or air and off gas is introduced through line **216**, passes through annular chamber **218** in *indirect heat exchange* with the combustion zone," column 18, lines 58-63); and
- e. a second inlet (i.e., air introduction means **210**) positioned upstream of the central passageway from the atomization fluid passageway outlets **222** (column 18, lines 38-44).

Piotter discloses the second inlet **210** "can be any of the well known means for creating a *swirling annular stream of air*, such as *an annular ring* with fins at appropriate angles, *a plurality of peripheral, tangential introduction ports or the like*," thereby improving the mixing of the fluid streams via a combination of axial and radial flow, inherent of the swirling motion

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(emphasis added; column 18, lines 40-44). Although Piotter does not specifically identify such means as a “sparger”, the means as disclosed functions substantially as the recited “sparger... comprised of a cylindrical conduit containing a plurality of sparger fluid passageways”, and therefore meets the claims.

Piotter is silent as to the specific angle of the atomizing fluid passageway outlets **222**. In any event, it would have been an obvious design choice for one of ordinary skill in the art at the time the invention was made to select an appropriate angle (i.e., a forward angle measurement greater than 60°) for the outlets in the apparatus of Piotter, on the basis of suitability for the intended use and absent showing any unexpected results thereof, since the specific angle degree is not considered to confer patentability to the claim since the precise angle would have been considered a result effective variable by one having ordinary skill in the art. Also, it is noted that the present specification sets forth on page 18, lines 18-20, that the claimed angle measurement, is at best, a preferred limitation. As such, without more, the claimed angle measurement cannot be considered “critical”. Accordingly, one having ordinary skill in the art would have routinely optimized the degree of the forward angle in the system to obtain the desired fluid flow characteristics, *In re Boesch*, 617 F.2d. 272, 205 USPQ 215 (CCPA 1980), and since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233.

Regarding claim 44, Piotter (FIG. 6; column 18, lines 44-56) discloses the central passageway comprises a stream splitter (i.e., barrier **212**) positioned within the passageway upstream from the position **222** at which the atomization fluid passageways exits.

Regarding claim 46, Piotter (FIG. 6) further discloses the central passageway has a

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circular cross-section, wherein the atomization fluid passageway outlets **222** are positioned concentrically about the central passageway.

Regarding claims 47 and 50, Piotter discloses at least one of the two dimensions of the central passageway converges in a downstream direction along at least a portion of its length (i.e., converging upper section of nozzle **224**; FIG. 6), and at least one of the two dimensions of the spray distributor **206** diverges in a downstream direction along at least a portion its length (i.e., diverging lower section of nozzle **206**; FIG. 6). As illustrated, the converging dimension of the central passageway and the diverging dimension of the distributor are co-planar.

Conclusion

5. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a). A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

* * *

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jennifer A. Leung whose telephone number is (571) 272-1449. The examiner can normally be reached on 8:30 am - 5:30 pm M-F, every other Friday off.

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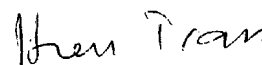
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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Glenn A. Caldarola can be reached on (571) 272-1444. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0661.

Jennifer A. Leung

January 21, 2004 



HIEN TRAN
PRIMARY EXAMINER